INTERNATIONAL CO-OPERATION IN THE FIELD OF SATELLITE NAVIGATION IMPROVEMENT: EUROPEAN PERSPECTIVE

Leonard ŁUKASZUK*

Para citar este artículo puede utilizarse el siguiente formato:
Leonard Łukaszuk (2012): "International co-operation in the field of satellite navigation improvement: European perspective", en *Revista europea de derecho de la navegación marítima y aeronáutica*, n.o 28 (octubre 2012), pp. 35-37. En este sentido se puede ver http://www.eumed.net/rev/rednma/28/ll.pdf en línea.

SUMMARY: The Ranging and Integrity Monitoring Station (RIMS) as a part of the European Geostationary Navigation Overlay Service (EGNOS). The RIMS station is a significant element of European infrastructure using to purpose of air transport as a navigation instrument to improve air navigation on the whole. These RIMS stations measure the positions of each EGNOS satellite and compare accurate measurements of the positions of each GPS and GLONASS satellite with measurements obtained from the satellites' signals.

KEY WORDS: The RIMS a station, EGNOS, Air transport navigation, GPS, GLONASS.

RESUMEN: Las estaciones terrestres de telemetría y control de la integridad (también llamadas *RIMS*, por sus siglas en inglés) son parte del Servicio europeo de superposición para la navegación geoestacionaria (EGNOS). Las estaciones RIMS son de gran importancia para la infraestructura europea, concretamente para el transporte por aire, pues suponen un instrumento de navegación para mejorar aquella de tipo aéreo en su conjunto. Las estaciones RIMS calculan la posición de cada satélite EGNOS y comparan las mediciones precisas ofrecidas por cada satélite GLONASS y GPS aquellas obtenidas de las señales de los satélites.

PALABRAS CLAVE: Estaciones RIMS, EGNOS, Navegación aérea, GPS, GLONASS.

1. According to the Agreement both of the European Space Agency (ESA) – composed of 15 Member-States, and the Centre for Space Research of the Polish Academy of Sciences-under direction Professor in International Law Zbigniew Kłos, and thanks financial support by the Polish Committee of Scientific Research, has been established within the above Centre in Warsaw, the Ranging and Integrity Monitoring Station (RIMS) as a part of the European Geostationary Navigation Overlay Service (EGNOS). This one is the first unit of global satellite navigation system GALILEO[1], as have been build by European Union. The Warsaw RIMS station will cover all Central and East European Countries. In 27th September 2004 took place the opening ceremony of this station, as ESA initiative.

Mr Dominique DETAIN, representing Communication Direction of European Union and ESA, delivered occasional speech, while opening the Warsaw RIMS Station. This station is real example turning to account satellite technique also to economy purposes and to meet demands of public needs. The RIMS station is a significant element of European infrastructure using to purpose of air transport as a navigation instrument to improve air navigation on the whole.

* Professor of International Public Law. University of Warsaw (Poland).
[1] See: GALILEO, *The European Programme for Global Navigation Services*, eesa, BR – 186,2nd impression European Commission, Nordwijk, The Netherland, March 2003.

2. Galileo comprises a group of 30 satellites divided between three circular orbits at an altitude of around 24 000 km to cover the Earth's entire surface. They will be supported by a worldly network of ground stations. There are two radio navigation satellite networks: the US GPS and the Russian Glonass systems, both designed for military purposes. Galileo offers an alternative to the GPS and US industry[2].

Satellite transmission is now using in aviation and shipping and in other areas. Applications open to the Galileo system is varied. The financial support to aviation and shipping operators alone is estimated at some EUR 15 billion between 2008 and 2020. This includes savings generated by more direct aircraft through better air traffic management, more efficient ground control, fewer flight delays and a single global multipurpose navigation system. Similar support can be expected for shipping[3]. Galileo is valuable tool for emergency services as e.g. sea rescue, and to protecting the environment, and also in the event of an aviation accident or an oil tanker wreck.

Sometimes GPS signal interruptions can have disastrous consequences, especially as there is no warning and no immediate information about errors[4].

A Canadian research body examined the case of an aircraft affected by an unannounced signal interruption of more than 80 minutes, aggravated by an initial positioning error of 200 km when contact was again established. Also the Icelandic aviation authorities reported several transatlantic flights their control zone similarly disturbed. Civil aircraft suffered 20-minutr signal interruptions in three US states. Airline captains have reported the same phenomenon over the Mediterranean. Therefore the European Union decided, in close co-operation with the European Space Agency, to develop a system of its own that meets the criteria for accuracy, reliability and security[5]. Galileo offers constant accuracy thanks to the structure of its satellite and ground relay system and Guaranted accuracy to 1 m is necessary for such applications as entering a sea port.

Some legal aspects should be also here shown. As significant feature is that: Galileo is adopting an innovative legal structure to establish public-private partnership[6]. An original form of company provided for in Article 171 of the Treaty establishing the European Community has been set up: a Joint Undertaking. Its founder members are the EU and ESA. The European Investment Bank and firms subscribing a minimum of EUR million (EUR 250 000 for Small- and Medium-sized Enterprises. This is designed to encourage the private sector to become involved.

To the space sector, which is accustomed to benefiting from the EU's research programmes, the foundations for public-private partnership must be laid with a wide range of firms. Public funds cannot be expected to cover all of the costs involved. But it is the responsibility of the public sector to carry out forward their development – as with Ariane and Airbus – it is also necessary for large firms, if they want to survive in the face of world competition.

[2] *Ibidem*, p. 7.
[3] *Ibidem*, p. 8.
[4] *Ibidem*, p. 7.
[5] *Ibidem*, p. 8.
[6] *Ibidem*, p. 10.

Galileo will enable Europe to acquire technological independence, as it did with the Ariane[7] and Airbus initiatives. Europe should be included in one of the main industrial sectors of the 21st century[8].

In the context of Galileo system should be to mention here other one as useful comparison.The Global Transmission Services (GTS)[9] experiment is designed to investigate the possibilities of transmitting a time signal from the International Space Station to synchronise clocks on the ground. GTS is the first commercial experiment aboard the International Space Station. GTS broadcasts the Station's current orbital position and its main scientific objectives are inter alia: to verify the performance and accuracy of a time signal broadcast to Earth from low orbit under real space operational conditions and to measure disturbing effects such as Doppler shifts, multi-path reflections, shadowing and elevation effects. GTS consists of two major elements in the Station's Russian Zvezda module: the Electronics Unit (AU). The EU accommodates all the elements for the experiment, signal generation and signal distribution.

Zvezda and the AU were launched into orbit in July 2000.

The GTS signal was received at an investigation station in Stuttgart (Germany) in February 2002, while the Station was flying in the favourable Earth- pointing attitude. The encrypted signal was received and decoded, achieving the operational use of cryptographic modulation.

This modulation prevents the unauthorised use of signals. It is of interest to services such as the navigation signals of Galileo.

3. EGNOS as a joint project of the European Space Agency (ESA), the European Commission (EC) and Eurocontrol, the European Organisation for the Safety of Air Navigation, is Europe's contribution to the first stage of the global navigation satellite system (GNSS) and is a precursor to Galileo, the full global satellite navigation system under development in Europe[10].

EGOS is in Europe first venture into satellite navigation. It will augment two military satellite navigation systems now operating the US GPS and Russian GLONASS systems, to make them suitable for safety critical applications such as flying aircraft or navigating ships through narrow channels.

Recibido el 12 de junio de 2012 y aceptado el 5 de octubre de 2012.

[7] Mireille Couston, "Espace ou nuit noire?", *Revue française de droit aérien et spatial*, Vol. 227 – N° 3 – Juillet – Septembre 2003 – Publication trimestrielle, pp. 247–248.

[8] *Ibidem*, p. 9.

[9] See: F.M. Huber, J.D. Schiemann, "Transmitting from Space. The glonal transmission services experiment, on station", *The Newsletter of the Directoriate of Human Spacelight*, eesa, no. 16, March 2004, pp. 18–20.

[10] See: esa paper entiteld: *EGNOS. European Geostationary Navigation Overlay Service*, delivered to the Polish Centre for Space Research in September 2004.